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ABSTRACT

Factors that influence college choice and enrollment patterns in both the United States and England were identified, based on a comparative literature review. It was found that the reasons given by students for attending universities in the two countries are very similar, in spite of the fact that the systems of higher education in these countries are very different. In addition, the patterns of enrollment that have developed throughout the twentieth century show remarkably parallel trends, with the region immediately surrounding the university sending proportionately fewer students to the institution while areas at greater distances have increased their role in the composition of the student body. It is suggested that the resultant patterns of enrollment at English and U.S. universities can be described as being a function of distance decay and may be explained to a large extent by the use of the potential model. (SW)

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UNIVERSITY ENROLLMENT PATTERNS IN ENGLAND AND THE UNITED STATES

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Universities in England and the United States enroll large numbers of students each year and these men and women represent an important segment of the future labor force. Between them the two systems of higher education have many differences in general philosophy with the universities in England being highly selective in their admittance policies and much more specialized in their degree programs than has been the case in the United States. These differences are responsible in part for the fact that the proportion of full time enrollments in higher education for 18 year olds is about ten times greater in the USA than in England.

Given the high selectivity, early coursework specialization and the resultant smaller relative and absolute numbers of university students in England than in the USA it was not expected that there would be similar underlying reasons of why students go to universities, in particular, the means by which they make their personal choice of an institution to attend. Since much research has been undertaken in both countries to determine the bases for the decision

making process of university selection by prospective undergraduates an assessment of this question was undertaken by means of a comparative review of the available literature. In the USA several studies have ascertained that two of the most important elements in determining which students go to college are the intelligence and socio-economic background of the individuals.[1] Further research has identified other variables deemed to be of some significane in explaining why American students attend institutions of higher education, most notably the influence of family, peers and home area.[2] In attempting to summerize the literature on this topic in the USA, Feldman and Newcomb extrapolated the many personal factors involved in the decision making process as follows:

> "The selection of a particular undergraduate institution is the outcome of a complex interaction of factors which include the aspirations, abilities and personality of the student; the values, goals and socio-economic status of his parents; the direction of the influence of his friends, teachers and other reference persons; the size, location and tuition costs, curricular offerings and other institutional characteristics of the various colleges; the image of these colleges held by the student and by those whose advice he seeks."[3]

To clarify the myriad of reasons given by students for attending institutions of higher education Richards and Holland used factor analysis as a mechanism for integrating some 27 considerations used by students in the decision making process. From this analysis emerged six factors related to personal and institutional influences:

(i) the academic reputation of the institution; (ii) its cost and location; (iii) its religious emphasis; (iv) its size; (v) its social atmosphere; and (vi) advice from peers, parents and teachers.[4] Grose, using a scaling approach to analyze the same question for Amherst College, came up with results very similar to the findings of Richards and Holland.[5]

The literature concerning why students choose to attend universities in England is less voluminous than that for the USA, perhaps because one is dealing with significantly smaller absolute numbers of students, a very small proportion of the total populations and the fact much greater emphasis is placed upon selectivity by the universities of students they wish to admit, a decision based primarily upon examination results. For those students who do have the necessary qualifications for university entrance, however, a certain amount of personal selection does go on as they apply to these institutions for admittance consideration. Neave has indicated that the location of the university close to home was a significant factor in the decision making process for a minority of students and that the proportion of students who maintained home links as a reason for their choice of a university varied from 12 percent for students from the "professional class" to 21 percent from the "manual class."[6] The British class structure of its society may be also a factor, as the universities are perceived as being middle and upper

class institutions, furthermore, the fact that the significant increases in university enrollments during the past 30 years have failed to alter the 6.5 to 1 ratio of non-manual to manual households from which these students come, tends to support this viewpoint.[7] In a detailed study of university freshmen from comprehensive schools it was determined that the major reasons given by these students for their choice of a university to attend strongly parallelled those that Richards and Holland found in their factor analysis study of US students. In this English study the reasons given by the undergraduates were: (i) the university's reputation; (ii) that the university's teaching staff were well known; (iii) recommendations by school teachers; (iv) recommendations from former school students who now attend the university; and (v) proximity to home.[8]

This survey of the US and English literature would indicate that although the systems of higher education in each country differ in goals, structure and size, the underlying reasons given by students for selecting an institution of higher education to attend are closely related. The focus of the next part of this study was to ascertain if the enrollment patterns of the two student groups also followed similar patterns.

Geographical studies of the spatial organization of enrollments have indicated that with increasing distance from each institution

the number of students per county decreases. Brownell and Stanley in their historical study of enrollments at colleges in New York State found that since the 1920's the relative numbers of students coming from the counties close to each institution has diminished, as the market areas of the institutions expanded to cover the entire state.[9] It should be noted, the home counties of the colleges still represent the largest single source of students, with the enrollments declining with increasing distances to be travelled. This distance decay factor has been recognized at a wide variety of institutions and has been strongly correlated in the negative mode with the decreasing numbers of students from areas further and further away from the university.[10] In addition, it has been recognized that the larger the urban centers the greater the absolute number of students are likely to come from the location thus distorting the smoothness of the distance decay curve.[11] These two elements in the enrollment pattern strongly parallel the general patterns of regional migrations and in fact the movement of students to and from universities each year may be viewed as a temporary migration. As a result, the basic migration or gravity model has been well demonstrated in the USA to explain the enrollment patterns of students attending university and thus may be used as a mathematical tool for assessing the spatial patterning of the distribution of students attending universities in England and the USA.

The use of gravity models in the social sciences has been viewed as an attempt to emulate the precision of the physical sciences in research endeavors. Although utilized in the nineteenth century, it was not until the 1920's that the models began to attract significant interest, however, today the basic gravity has been modified and is widely used in the potential format by geographers when analyzing the spatial patterns of migrations. The basic formulation of the potential model is $I_{i-j} = P_i/D_{i-j}$ where the degree of interaction "I_{i-j}" from location 'i' to location 'j' is represented as a function of the mass of the population at the point of origin (P_i) and the frictional effect of the distance between the origin and the destination (D_{i-j}). In attempts to ascertain an understanding of how the underlying forces influence and shape student temporary migrations or enrollment patterns, studies in the USA have determined that the basic potential model is of great value. Since the probable distances to be travelled by students are so great in the United States, most scholars square the distance variable (D_{i-j}^2) thus producing a curvilinear relationship which takes into consideration the few students who travel great distances to go to college. In the study of student patterns of movement from home to university in Ohio, McConnell found that modifications of the population variable to take into consideration the socio-economic status of each origin area did not significantly increase the explanation

levels obtained by the basic potential model alone. The correlation coefficient measuring the actual enrollment pattern and that expected by the potential model was r = +0.9050 (significant at the 0.05 level) which led McConnell to conclude that "...no refinement of the model is statistically superior to the basic potential model in accounting for the spatial variation of undergraduate enrollment by county of origin."[12]

In a more detailed study in Oklahoma the reasons given by students attending the University of Oklahoma and Oklahoma State University were analyzed by means of factor analysis. The variables derived from this statistical transformation were placed in a stepwise regression model along with other variables measuring income levels, ethnicity, educational levels and urbannes, while utilizing the potential model as the first independent variable and correlating all of these inputs with the enrollment levels per county for each university. In each instance the potential model explained so much of the enrollment pattern (for the University of Oklahoma the stepwise regression coefficient of "r" was +0.9472 and for Oklahoma State University it was +0.9112, both significant at the 0.05 level) that there was no statistically significant increase in the level of explanation of the enrollment patterns by the additional variables[13] thus parallelling McConnell's findings in Ohio.

The use of the potential model to explain enrollment patterns

of undergraduates attending institutions of higher education has been modified and added to in several studies of universities in New York State but in none of these cases has the additional information or transformations produced statistically significant increases in the levels of explanation of the enrollment patterns.[14] As a result this model will be utilized to determine if similar patterns of enrollment decline with increasing distance from each institution, modified by large urban areas, exists for the English universities.

As with the US universities the spatial patterns of enrollments have changed greatly in England over the past one hundred years. During the late nineteenth and early twentieth centuries students attending most English universities resided in the region immediately surrounding the institution, in fact, "More than a century ago, studies which decided upon the siting of the University of Manchester assumed that students would come by train from towns fifteen miles around."[15] It should be noted that an important reason for the establishment of the major civic and provincial universities such as Leeds, Hull and Leicester was to meet the local demand for higher education in these rapidly growing urban areas. As a result, the early pattern of recruitment for the universities, excluding Oxford and Cambridge, was predominately local and thus the provision of residential accommodation for students formed no part of the concept

of a university, as most students lived at home and commuted daily to lectures.[16] As the twentieth century progressed this localized pattern of enrollments began to change so that between 1908-9 and 1964-5 the proportion of students residing within 30 miles of the Universities of Leeds, Manchester and Bristol declined from 78 to 18 percent, 73 to 23 percent and 87 to 12 percent respectively.[17] These institutions reflected the national trend of decreasing enrollment levels in the home regions and a greater intensity of enrollments at increasingly distant locations from the institutions, so much so that Dent has stated that, with the exception of the University of London system, less than ten percent of English university students reside at home thus, "Nowadays, all universities are 'National Universities' in the sense that their students come from all over the country though a fairly large regional majority is still found in most if not all of the modern universities."[18]

The spatial transformation that has occurred was due to the advent of three factors which encouraged the increased mobility of students; (i) the increase in available university housing, this is especially true in the case of the universities established after World War II; (ii) the increasing availability and generosity of university grants to students; and (iii) increasing competition for university places, that made students look at institutions which they might not otherwise have considered.[19]

In spite of national and educational differences, the trends in enrollment patterns at universities in the USA and England have been remarkably similar and in general terms the spatial patterning that has resulted has been the same. To test this ascertion the enrollment data for 19 universities were tabulated on a county basis. The desire line distances from each institution to the central point of each county of England and Wales were measured; data for Scotland and Northern Ireland were not available. These distance measurements represented the (D_{i-j}) element of the potential model while population totals for each county represented the (P_i) part. For each of the 19 universities the enrollments of full time undergraduates per county were correlated with the Pi/D_{i-j} element of the potential model, to test whether the expected level of interaction was similar to that of the actual enrollments. The results of these calculations are listed on Table I.

In most cases the correlation coefficients indicated a strong relationship between the expected and the actual pattern of enrollments, a finding which parallelled the results found in the research work in the State University of New York system and at individual institutions elsewhere in the USA. It must be admitted, however, that the relationship for the universities of Bristol, Reading, Warwick and Keele were rather low, but by mapping the correlation coefficients of all the universities studied it was discovered that

these low readings were for institutions which were clustered in the central portion of England. To test whether the location of the university might influence the explanation levels of enrollment distributions, a second correlation analysis was performed utilizing the mean distance of each institution from all counties in England and Wales, as a measure of relative location, and the coefficients of determination obtained from Table I. The results of this analysis did indicate that there was a positive relationship ($r = 0.4857$, significant at the 0.05 level) between the higher levels of explanation of the enrollment patterns by the potential model and the increasing size of the distance measures of centrality. This finding partially helps to explain the relatively low readings for the universities of Bristol, Reading, Keele and Warwick although other factors, unique to each institution are also at play. An analysis of these phenomena is beyond the range of this general study but one that could be extremely valuable to each individual university.

Overall the levels of explanation obtained for the enrollment patterns at the 19 English universities when the potential model was utilized strongly parallelled those observed at universities in the USA. The trends in enrollment pattern development through time were also similar, with relatively fewer and fewer students coming from the region immediately surrounding each university. Also, there were great similarities to be found in the reasons given by

students for the selection of their university, inspite of the fact that the two educational systems are widely different. Furthermore, enrollment patterns in both nations can be explained, sometimes to a great degree of specificity, by the use of the potential model. In conclusion, it may be stated that the spatial patterns of university student enrollments in England and the USA are very similar and that the use of potential or migration models can produce high levels of predictive accuracy of university enrollment distributions.

FOOTNOTES

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TABLE I

CORRELATIONS OF ENROLLMENTS PER COUNTY FOR THE ENGLISH UNIVERSITIES AND THE POTENTIAL MODEL[1].

University	Correlation Coefficient[2].	Coefficient of Determination
Birmingham	0.2946	8.68%
Bristol	+0.3676	13.51%
Durham	+0.5043	29.19%
East Anglia	+0.9453	89.35%
Exeter	+0.6087	37.05%
Hull	+0.8359	69.87%
Keele	+0.4009	16.07%
Kent	+0.9811	96.26%
Lancaster	+0.7362	54.19%
Leeds	+0.8159	66.57%
Leicester	+0.6871	47.21%
Manchester	+0.8449	71.38%
Newcastle	+0.8645	74.74%
Nottingham	+0.6602	43.59%
Reading	+0.3489	12.17%
Southampton	+0.5253	27.60%
Sheffield	+0.8523	72.64%
Sussex	+0.9780	95.65%
Warwick	+0.4373	21.05%

1. Potential Model = (Pi/Di-j).

2. All significant at the 0.05 level.